

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant	: Paul R. Sharps et al.	Art Unit	: 1753
Serial No.	: 10/773,343	Examiner	: Nam X. Nguyen
Filed	: February 6, 2004	Conf. No.	: 6467
Title	: APPARATUS AND METHOD FOR INTEGRAL BYPASS DIODE IN SOLAR CELLS		

**Mail Stop Appeal Brief - Patents**

Commissioner for Patents

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REPLY BRIEF

Pursuant to 37 C.F.R. § 41.41, Applicant responds to the Examiner's Answer as follows

**(A) Concerning the rejection of claim 37 as unpatentable under 35 U.S.C. § 112,**

**First Paragraph**

(1) In the Appeal Brief, Applicant asserted that cells 604, 606 and 608 can be considered as part of a bypass device that also includes bypass diode 620. The Examiner's Answer argues, at page 7, lines 21-22, that the Applicant's assertion is not "a reasonable interpretation of the claim or instant Figure 6."

Applicant respectfully disagrees and submits that, in view of the structure of the multijunction solar cell 640, one of ordinary skill in the art would find the Applicant's claim interpretation not only reasonable, but correct.

Claim 37 recites, in part, that the integrated semiconductor structure includes a bypass device "integral to a subcell for passing current when the solar cell is shadowed and having p-type, i-type and n-type layers." As shown in FIG. 6 and disclosed in paragraph 54 of the present application, the multijunction solar cell structure 640 is divided into two portions 642 and 644, "wherein portion 642 includes solar cell(s) for converting solar power to electrical power and portion 644 contains a bypass diode 620." The portion 644 clearly includes a p-i-n diode 620 as well as cells 604-608 located on the right side of well 650. Furthermore, the portion 644 is integrally connected to subcell 604 on the left side of well 650 through the germanium substrate 602. Additionally, given that the portion 644 includes the bypass diode 620, it inherently serves to pass current "when the solar cell is shadowed" as recited in claim 37. Therefore, one of

ordinary skill in the art would understand the portion 644 to be an example of the claimed "bypass device."

(2) At page 8, lines 1-8, the Examiner's Answer argues that the claim language "a bypass device integral to a subcell" would be "read by a skilled artisan as indicating that the bypass device and subcell are separate portions of an integral structure."

Applicant submits that even if the claim language was interpreted in the manner suggested by the Examiner, claim 37 still finds support in the specification. Applicant respectfully points out that, as noted above, the present application clearly distinguishes between two separate portions of an integral multijunction solar cell (*i.e.*, a portion 642 that includes solar cell(s) for converting solar power to electrical power and a portion 644 that contains a bypass diode 620) in which the two portions are integrally connected through a germanium substrate 602. In particular, the portion 644 is integrally connected through substrate 602 to the cell 604 located on the left side of well 650. Therefore, the portion 644, which incorporates both the bypass diode 620 and cells 604-608 on the right side of the well 650, is an example of the claimed "bypass device" that is "integral to a subcell."

(3) At page 8, lines 9-18, the Examiner's Answer argues that "no current will pass through the layers 604, 606 and 608 that lie beneath diode 620" and therefore "it is not clear how they can be considered a part of a bypass device...for passing current when the solar cell is shadowed."

Although claim 37 recites a bypass device for passing current when the solar cell is shadowed, there is no claim limitation that requires each layer in the bypass device pass current under those conditions. Even though cells 604-608 on the right side of well 650 may pass little or no current when the solar cell is shadowed, they still are considered part of portion 644 which passes current, through at least the bypass diode 620 and shunt 630, during shadowing of the solar cell. Cells 604-608 on the right side of well 650 are still part of the "bypass device."

**(B) Concerning the rejection of claims 37, 47 and 69 as unpatentable under 35**

**U.S.C. § 112, First Paragraph**

(1) At page 6, lines 9-11, the Examiner's Answer argues that "no particular part of the specification is indicated as supporting" the addition of the word "substantially" as used in the pending claims. Applicant respectfully disagrees and submits that the specification does, in fact, support the phrase "substantially the same composition and thickness."

Indeed, the Examiner himself recognizes that "minor variations would inherently be present in any deposited layers, which would be recognized by one of ordinary skill in the art, and which would be included in the scope of a claim reciting 'the same composition and thickness'." (*See* Examiner's Answer at page 6, lines 2-8) The non-final Office action acknowledges the same point (*see* non-final Office action, March 6, 2007, p. 17, par. 21, "Slight variations in thickness and composition are of course inherently present in any deposited film, and any skilled artisan reading the specification will recognize that the layers described will have such variation.")

Although the claims as originally filed did not recite that the layers have the "same" or "substantially the same" composition and thickness, that language was introduced into the claims at a later date after Office actions identified a reference that necessitated clarification of the claimed subject matter (*see* Amendments dated May 20, 2005 and November 7, 2005). Accordingly, Applicant is simply making express what is already recognized to be inherent in the specification and claims.

(2) At page 6, lines 9-11, the Examiner's Answer argues that addition of the term "substantially" broadens the claims beyond the scope of the original disclosure in that "it adds room for interpretation beyond that that would have been recognized by a skilled artisan reading the original specification."

Again, Applicant respectfully disagrees and submits that the addition of the term substantially does not broaden the scope of the claim beyond that which would have been recognized by one skilled in the art.

As already noted, the Examiner's Answer acknowledges that a person of ordinary skill in the art would understand from the specification as filed that minor variations are inherent for any deposited layers and would be included in the scope of a claim reciting "the same composition and thickness." (*see* page 6).

Applicant is not attempting to expand the scope of the claims improperly. Although the claims are to be given their broadest reasonable interpretation consistent with the specification during examination (MPEP § 2111), Applicant recognizes that such an interpretation might not be applied in other contexts. In particular, Applicant wishes to avoid a literal, narrow interpretation of the phrase "the same" that might be applied in other situations. Similarly, Applicant wishes to avoid any potential estoppel that might be applied to such a literal, narrow interpretation. Therefore, as previously explained, the Applicant is merely attempting to claim expressly what already is recognized as inherent in the specification and the claims.

**(C) Concerning the rejection of claims 37, 47 and 69 as unpatentable under 35 U.S.C. § 112, Second Paragraph**

(1) At page 9, lines 13-14, the Examiner's Answer argues that "there is no basis present for determining how close to 'the same' layer thicknesses must be to be 'substantially the same.'" This is incorrect.

The Examiner acknowledges that a person of ordinary skill in the art would recognize that "minor variations would inherently be present in any deposited layers." (*See* Examiner's Answer at page 6, lines 5-6). As explained in the Applicant's § 1.132 Declaration, the term "substantially the same thickness" corresponds to "normal" variations of up to two to three percent in thickness of a compound semiconductor layer over the surface of the wafer. (*See* Applicant's § 1.132 Declaration, p. 2, par. 5). A person of ordinary skill in the art would have understood and recognized such variations as typical.

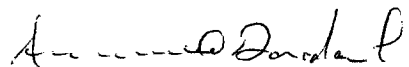
Conclusion

For these reasons, and the reasons stated in the Appeal Brief, Applicant respectfully submits that the final rejections should be reversed and the application should be allowed.

Please apply any charges or credits to Deposit Account No. 06-1050.

Respectfully submitted,

Date: 12/6/07

  
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